Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matters of -	)	
	)	
A National Broadband Plan for Our Future	)	GN Docket No. 09-51
	)	
International Comparison and Consumer Survey Requirements in the Broadband Data Improvement Act	)	GN Docket No. 09-47
	)	
Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, as Amended by the Broadband Data Improvement Act	)	GN Docket No. 09-137

Reply Comments of The Nebraska Rural Independent Telephone Companies

September 8, 2009

SUMMARY

The Nebraska Rural Independent Companies ("Nebraska Companies") emphasize the central role of the public Internet in the nation's broadband policies, and urge the Commission in the National Broadband Plan to explicitly interpret "broadband capability" as used in the Recovery Act, to mean "*broadband access to the public Internet.*"

The Nebraska Companies propose a two-stage "broadband" definition – (1) a simple provisional definition, to be effective through 2010, based on advertised last-mile bit rate, to serve interim purposes; and (2) a long-term, multidimensional definition to be articulated by mid-2010 that involves extensive measurement and public reporting of various network performance metrics, in order to faithfully reflect actual user experiences. The Nebraska Companies recommend that the Commission rely on the work already performed by industry and international bodies in quantifying Internet performance.

The Commission should recognize the end-to-end nature of Internet Service Providers' retail "broadband Internet service," and should adopt a consistent perspective regarding (1) the end-to-end scope of ISPs' retail service offerings, (2) network performance as experienced by end users and (3) the network segment(s) whose performance is to be measured under a multidimensional broadband definitional scheme.

The Nebraska Companies believe adherence to the principles outlined in these comments will facilitate the Commission's National Broadband Plan achieving its chief objective – seeking to ensure that all people of the United States have broadband access to the public Internet.

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Reply Comments of The Nebraska Rural Independent Telephone Companies

I. Introduction

The Nebraska Rural Independent Companies ("Nebraska Companies")[1] appreciate the opportunity to comment and hereby submit their reply comments in the above-captioned proceedings regarding the definition of "broadband" for purposes of the development of a National Broadband Plan.[2] As the Recovery Act[3] directs the Commission to develop a national broadband plan that "seek[s] to ensure that *all people of the United States* have access to broadband capability,"[4] the Nebraska Companies are particularly mindful of the Commission's goal of ensuring such *universal* access to broadband capability.

The Nebraska Companies believe the Commission should explicitly acknowledge and support the preeminent position of *access to the public Internet* among the various uses to which broadband transmission technology can be put, and should focus its efforts in developing the National Broadband Plan ("NBP") accordingly. While broadband capabilities unrelated to the public Internet may indeed serve some public purposes, the Nebraska Companies believe Congress's primary intent in subsection 6001(k) of the

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[1] Companies submitting these Comments are: Arlington Telephone Company, The Blair Telephone Company, Cambridge Telephone Company, Clarks Telecommunications Co., Consolidated Telco, Inc., Consolidated Telecom, Inc., Consolidated Telephone Company, Curtis Telephone Co., Eastern Nebraska Telephone Company, Great Plains Communications, Inc., Hartington Telecommunications Co., Inc., Hershey Cooperative Telephone Company, Inc., K&M Telephone Company, Inc., Nebraska Central Telephone Company, Northeast Nebraska Telephone Co., Rock County Telephone Company, Stanton Telephone Co., Inc. and Three River Telco.

[2] Public Notice, *Comment Sought on Defining "Broadband", NBP Public Notice #1*, GN Docket Nos. 09-47, 09-51, 09-137, DA 09-1842 (Aug. 20, 2009) (*Notice*).

[3] American Recovery and Reinvestment Act of 2009, Pub. L. No. 111-5, 123 Stat. 115, (Feb. 17, 2009) (*Recovery Act*).

[4] *Id.*, Div. B, Title VI, § 6001(k); emphasis added.

Recovery Act was to direct the Commission to prepare a plan to ensure that *all* people of the United States have *broadband access to the public Internet*.[5]

II. Definitional context

Broadband access to the public Internet

The Nebraska Companies believe, because of the central role the public Internet[6] will necessarily play in the NBP, the Commission should adopt a precise definition of the "public Internet." The Nebraska Companies offer the following:

> The public Internet is the globally unique collection of interconnected Internet protocol (IP) networks that deliver and exchange packets in the public IP address space as defined by the Internet Corporation for Assigned Names and Numbers (ICANN) under the terms of its contract with the U.S. Department of Commerce.

Subsection 6001(k) of the Recovery Act uses the adjective "broadband" as a modifier for "capability," "infrastructure" and "service(s)." As noted above,[7] the Nebraska Companies believe the Commission should interpret "broadband capability" as used in the Act to mean "*broadband access to the public Internet*." Similarly,

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[5] The Nebraska Companies believe the most reasonable interpretation of *broadband capability* as used in the Recovery Act, which identifies "broadband capability" as something that "*all people* of the United States" should "have access to," is *broadband access to the public Internet*. Subparagraph 6001(k)(2)(D) lists a number of national purposes whose advancement through the use of broadband infrastructure and services the NBP must address. Presumably, since such use might not necessarily be "by the public" or "all people of the United States," the public Internet could be incidental, or even irrelevant, to broadband utilization's advancing some of these purposes. These exceptions notwithstanding, *access to the public Internet* appears to be the chief concern of subsection 6001(k) and should be the Commission's chief concern in developing the NBP.

[6] Unless otherwise noted, all comments cited are those filed in the above-captioned docket on Aug. 31, 2009. *See* Free Press Comments at 19-20: "As embodied by the Recovery Act, "broadband" is about the process of two-way end-to-end communications over the public Internet;" Google Comments at 3-4: "Importantly, broadband is not the Internet, or even access to the public Internet," but also "For purposes of this proceeding, and the promotion of a sound NBP, the Commission's broadband public policy should be to promote a means of unencumbered access to the public Internet and all its richness for every American;" New America Foundation Comments at 4: "the Commission should include a requirement that broadband provides high-speed access to the public Internet."

[7] Nt. 5 *supra*.

"broadband infrastructure" should be interpreted to mean "one (or more) transmission network(s) providing *broadband access to the public Internet*."

The Recovery Act's use of the term "broadband service" requires a little elaboration.

An Internet service provider (ISP) utilizing *broadband infrastructure* to provide *broadband capability* (i.e., broadband access to the public Internet) is a "broadband-capable ISP."

The service that a broadband-capable ISP offers is often called "broadband Internet access service."[8] But *access to* the public Internet is not a finished retail service, offered to the public. The Nebraska Companies emphasize the following important point:

> **The retail service that a broadband-capable ISP offers to the public is an end-to-end service that includes transport *over* the Internet as well as broadband access *to* the Internet, and is more correctly called "broadband Internet service."[9]**

The ISP must arrange for (and often must also pay another carrier for) *transport to* and *transport across* the Internet backbone, in addition to operating the local broadband *access* network; all are inputs to the finished, *end-to-end Internet service* that the retail consumer experiences and pays for.

In fact, the Nebraska Companies no longer believe the term "broadband Internet access service" accurately reflects the reality of the Internet service business model for retail ISPs. The Nebraska Companies urge the Commission to carefully consider

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[8] Several commenters use the term "broadband Internet access service": Free Press at 8, 10-12; OPASTCO at 12; Time Warner Cable at 3; ViaSat at 2.

[9] Several commenters use the term "broadband Internet service": Center for Democracy & Technology at 4; Comcast at 2-5, 7-10; Google at 7.

reframing its own terminology in this regard,[10] and to interpret the term "broadband service" as used in the Recovery Act to mean "broadband Internet service" as described in the previous paragraph. The Nebraska Companies also urge the Commission to formally consider classifying "broadband Internet service" as a telecommunications service under the 1996 Telecommunications Act.

Primary purpose of "broadband" definition: Ensuring access

The Nebraska Companies also believe it is important for the Commission to identify in the NBP the purposes for which it intends to use, and the manner in which it expects to apply, its definition of "broadband." For example, the primary purpose of the definition will presumably be to facilitate the NBP's own "seek[ing] to ensure ... access to broadband capability."[11] In urban areas and other areas in which broadband Internet services are profitable, "seek[ing] to ensure ... access" may operationally take the form of enabling and evaluating market entry and competition,[12] coupled with a requirement that any Internet access network provider claiming to offer "broadband" access to the public Internet must publish its network's performance indicators according to standard metrics. In rural and high cost areas, where the cost of operating a broadband Internet access network exceeds the potential consumer revenue, and competition is therefore not

[10] The Commission has used the term "broadband Internet access service" in several Orders and Notices in recent years, including, e.g., Order on wireline broadband services FCC 05-150 (classifying "wireline broadband Internet access service" as an information service); NPRM on broadband service reporting requirements FCC 07-17; Declaratory Ruling on "wireless broadband Internet access" FCC 07-30; Order on broadband service reporting FCC 08-89; NBP NOI FCC 09-31.

[11] *Recovery Act*, Div. B, Title VI, § 6001(k).

[12] *See* Verizon Comments at 7, observing that competition works in many areas. "[I]n most areas of the country, multiple broadband providers exist and already offer a range of services well above any baseline level for broadband reporting purposes, and competition in those areas continues to drive providers to increase both the reach and capabilities of their services. For example, Verizon eontinues its rollout of its FiOS services and is preparing for the rapid deployment of its 4G mobile wireless service using LTE teehnology. Verizon's competitors are responding in kind by upgrading their own services to better compete."

economically viable, "seek[ing] to ensure ... access" could take the form of universal service support for Internet access network providers that meet certain "broadband" performance criteria, again coupled with the same public reporting requirements.

The Nebraska Companies urge the Commission to explore such issues as those noted above in this section, in order to clearly establish the context in which it intends to undertake its statutory directive to develop a Plan that "seek[s] to ensure that all people of the United States have access to broadband capability,"[13]

III. Responses to the Commission's Specific Requests for Comment

1. Form, Characteristics and Performance Indicators

A. Structure and Scope

The Notice lists a number of factors on which comment is requested, including the following three considerations of structure and scope:

(a) the form that a definition of broadband should take;

(b) whether to develop a single definition, or multiple definitions; and

(c) what segment(s) of the network each performance indicator should measure, such as the local access link to the end user, or an end-to-end path.

Two-stage broadband definition: Provisional and Long-term

The Nebraska Companies recommend the Commission approach the problem of defining broadband in two stages: (1) the Commission should adopt in the NBP a simple provisional definition applicable during 2010; and (2) the Commission should immediately undertake an effort to formulate a long-term multidimensional definition for the full decade from 2011 through 2020. The provisional definition should be expressed in terms that network operators are already prepared to measure and report – i.e.,

[13] *Recovery Act*, Div. B, Title VI, § 6001(k).

advertised last-mile bit rate – even though it is widely acknowledged, and the Nebraska Companies agree, that advertised last-mile bit rate is a poor or, at best, a very rough indicator of actual network performance.[14] On the other hand, the long-term definition of broadband should be expressed in terms – such as sustained throughput, latency and jitter – that more realistically describe a network's ability to support a variety of common Internet applications under "normal" and "peak" traffic loading conditions.

While the present situation is disjointed, the Commission must nonetheless start with the status quo. Today, advertised last-mile bit rate is perhaps the only performance indicator that many ISPs are able to report. Yet, as the ADTRAN white paper "*Defining Broadband: Network Latency and Application Performance*" clearly shows, latency is often as important as bit rate in delivering acceptable performance – even in loading commonly used web pages, due to the large number of "turns," or independently requested and delivered objects, required to load the page.[15] Latency and jitter are also very important in supporting highly interactive applications such as VoIP, gaming and video teleconferencing. Other factors such as packet loss and reliability, or network availability, can also affect users' experiences, and should be considered for inclusion in the long-term definition.

The Commission should adopt a provisional definition of broadband that is immediately applicable and meaningful, and should simultaneously commit to formulating by mid-2010 a long-term definition that reasonably accounts for the real,

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[14] *See* ADTRAN Comments at 2-3; Allied Fiber Comments at 3-4; Center for Democracy & Technology Comments at 5; Free Press Comments at 7-8; Google Comments at 10-11; NATOA Comments at 6; New America Foundation Comments at 3.

[15] *Defining Broadband: Network Latency and Application Performance*, White Paper, *attached to* Letter from Stephen L. Goodman, Counsel for ADTRAN, to Marlene H. Dortch, Secretary, FCC, GN Docket No. 09-51 (filed June 23, 2009) (*ADTRAN Latency White Paper*) at 11-14.

complex relationship between network performance as experienced and perceived by Internet users and the collection of metrics that reasonably quantify such performance.

End-to-end service; end-to-end experience; end-to-end measurement

As noted above, the retail service that ISPs provide is an end-to-end Internet access and transport service – between a user's IP-addressable device and myriad far-end IP-addressable devices.[16] The Nebraska Companies urge the Commission to take a consistent perspective regarding (1) this end-to-end scope of ISPs' retail service offerings, (2) the network performance as experienced by end users and (3) the network segments whose performance is to be measured under a multidimensional broadband definitional scheme.

Consider the case of a rural ISP. A rural ISP must normally pay another carrier for a "middle mile" link between its local broadband access network and the Internet backbone. This "middle mile" link could be a significant bottleneck, restricting the end-to-end performance the ISP's users experience. Furthermore, while it is true, as some

[16] Several commenters support "end-to-end" measurements, and emphasize the "end-to-end" nature of users' experience of Internet application performance. *See*, e.g., Allied Fiber Comments at 5: "Actual Performance Must Be Measured on an End-to-End Basis;" Fiber-to-the-Home Council comments at 5: "For users, overall (end-to-end) network performance is crucial and hence must be measured;" Kodiak-Kenai Cable Co. Comments at 7: "Critically, from KKCC's perspective, the specific indicators will have meaning only if measured on an end-to-end network path, and in high-usage periods"; NASUCA Comments at 5: "[T]he crucial factor in all this is the experience of the end user. Therefore, all performance indicators should measure the entire path ending with the link to the consumer;" Telcordia Comments at 4-5: "Satisfactory service delivery to end users depends on the interaction of multiple networks and systems that are often not under the control of a single entity. [Broadband Performance Indices] relevant to the user experience are necessarily 'end-to-end'," and 12: "end-to-end delay for VoIP should be bounded to enable conversation." Others object to measuring end-to-end performance, as this would somehow hold providers responsible for potential performance degradation outside the network provider's control. *See*, e.g., AT&T Comments at 6, CTIA Comments at 9, Verizon Comments at 9. Windstream's comments express both points of view, stating, on p. 7, both that measurements should be restricted to the portion of the end-to-end path under the provider's control ("If segments outside of a broadband provider's network are considered, assessments might unduly reflect bottlenecks outside of the provider's network – and produce results that suggest the provider is offering speeds slower than what is actually the case") as well as that "[t]he measurement should reflect actual throughput experienced by end users."

commenters observe, that an ISP has little or no control over Internet backbone performance,[17] any ISP's retail service offering – i.e., "broadband Internet service" – includes *transport over the Internet* as one of its inputs. Whatever the extent of *control* the rural ISP has over Internet backbone performance, any measurement of the ISP's cost of providing its retail "broadband Internet service" must include the access link(s) connecting its local broadband network to the Internet backbone and its costs for transport over the backbone. Whatever measurement metrics the Commission adopts for characterizing "broadband," at least some "broadband-qualifying" measurements must be made in a manner that accounts for end-to-end performance – between the retail user's IP-addressable device and a far-end IP-addressable device – so that the end-to-end retail "broadband Internet service" offered by the ISP is the entity whose performance is being measured and reported.

B. Performance metrics

The Notice invites comment on matters related to potential performance indicators, such as –

(c) whether an application-based approach to defining broadband would work, and how such an approach could be expressed in terms of performance indicators;

(d) the key characteristics and specific performance indicators that should be used to define broadband;

(f) how factors such as latency, jitter, traffic loading, diurnal patterns, reliability, and mobility should specifically be taken into account;

(h) the feasibility and verifiability of measuring different performance indicators.

[17] *See* AT&T Comments at 6, CTIA Comments at 9, Verizon Comments at 9. *But see also ADTRAN Latency White Paper* at 7-8, estimating average one-way core network delay at approximately 20 ms, indicating that Internet backbone congestion and consequent contribution to end-to-end delay is, at this time, minimal.

Industry and International Coordination

The Nebraska Companies urge the Commission to rely on the work already done by industry and international bodies to draw the connection between user experiences and expectations, on one hand, and specific network performance metrics, on the other, in the course of developing its long-term "broadband" definition. Telcordia has provided the Commission a valuable service by including in its comments many references to the large body of work published by such organizations.[18]

The NBP should initiate an accelerated effort to construct by mid-2010 a multidimensional definition of broadband that reflects, to a reasonably faithful degree, broadband networks' abilities to deliver quality user experiences. The NPB itself could propose a list of quantitative network performance indicators, such as the seven identified in Telcordia's comments,[19] that providers of broadband Internet service networks – local access and backbone alike – will be required to measure and publish.

The NBP should specify, or at least propose, a network performance measurement architecture, defining the points of network ingress and egress between which measurements should be made, specifying the times-of-day, durations and frequencies of various measurements and, for any local access network in which speed depends on distance from a central "hub" (including wireless and DSL, for example), the distance(s) from the central hub at which measurements are to be performed. Whenever possible, measurements should be specified in a manner that makes it possible for the measurements reported by the network operator to be independently verified by anyone with a reasonably high-performance personal computer. A degree of randomness should

[18] *See, generally,* Teleordia Comments; referenees are listed on pp. 51-54.

[19] *Id.* at 6.

be carefully introduced into the measurement architecture to more faithfully replicate the user experience and to minimize opportunities to "game" the measurement regime.

Retail ISPs should be required to measure and publish end-to-end performance indicators in addition to indicators characterizing the performance of their own local access networks alone. Providers of backbone Internet switching and transport should be required to measure and report key performance characteristics of their networks. With such overlapping performance quality information, the general public will be in a position to compare performance results, to identify anomalies and conflicts and to construct a reliable, comprehensive view of the broadband Internet service capabilities available in every part of the nation.

Free Performance Measurement Tools

The Nebraska Companies believe it is reasonable to expect that IETF members and others would happily volunteer to develop and publish software tools that can be freely downloaded and installed in users' personal computers and used to measure broadband Internet service performance in a very short time after the Commission announces its intent to require ISPs to report such measurements.[20]

The Commission should establish, or sponsor others in establishing, Internet-accessible performance measurement facilities, located at various points around the nation, that anyone may use in conjunction with publicly available user-installed software tools. The use of "standard" web pages, "standard" video downloads, etc. provided on

[20] The Nebraska Companies note the rapid development and publishing of a tool to detect interference with BitTorrent shortly after the FCC called attention to Comcast's treatment of BitTorrent sessions on its network. E.g., *Test if Your ISP is Throttling BitTorrent*, posted May 08, 2008, at http://hothardware.com/News/Test-if-Your-ISP-is-Throttling-BitTorrent/, describing a tool developed by the Max Planck Institute for Softwaresystems called Glasnost; information on Glasnost is available at https://svn.mpi-sb.mpg.de/NS/glasnost/README.]

publicly-addressable IP servers physically separate from actual commercial web sites (or other IP servers not devoted to measuring performance) eliminates concern that a user's experience of *network* performance will be influenced by the performance of any commercial web site or its server hardware. Further, the access links connecting these "performance standard" servers to the Internet backbone should have sufficient capacity to eliminate these links as a source of degraded end-to-end performance. In all of this activity, the FCC's role should be to establish the general parameters of the measurement regime, to authorize and certify measurement authorities, and to facilitate unambiguous measurement methodologies.

The Nebraska Companies do not believe there should be any significant cost to ISPs or to consumers involved with the development of these performance measurement tools. Once the Commission defines a handful of key parameters and announces its commitment to characterizing "broadband" in terms of those parameters, the Nebraska Companies are confident that the software and other needed resources will quickly be made available by interested individuals, research groups and other entities.

The Importance of Quality-of-Service (QoS) Negotiation Protocols

The Nebraska Companies also urge the Commission to encourage the development of Quality-of-Service (QoS) negotiation protocols and their deployment in the public Internet – *as long as they are publicly available protocols*. We believe that ISPs should be able to design broadband Internet service offerings that consumers can readily understand, including offerings that go beyond the one-dimensional service tiering by last-mile bit rate that characterizes today's Internet service market, but that *proprietary* QoS protocols deployed in the public Internet will ultimately degrade the utility of the public Internet as an engine of unfettered innovation. We believe that

implementation of public-domain QoS protocols, such as those outlined in 1994 in IETF RFC 1633, are essential for the continued vitality of the public Internet.

Some commenters have noted the potential value of QoS protocol deployment in the public Internet,[21] but none emphasize that such protocols should be in the public domain and not proprietary, in order to protect the openness of the public Internet.

While the Nebraska Companies recognize that this proceeding is not one devoted to the topic of "net neutrality," perhaps the most important policy analysis the Commission can provide to Congress in the NBP is to explain why QoS mechanisms that operate according to publicly available negotiation protocols should be deployed in the public Internet.

C. No Exceptions for Any Particular Technologies

The Notice asks –

> (g) whether different performance indicators or definitions should be developed based on technological or other distinctions, such as mobility or the provision of the service over a wired or wireless network.

The Nebraska Companies urge the Commission to adopt a definitional scheme for "broadband" that is completely technology-neutral.[22] Consumers are capable of evaluating for themselves the additional value to them of mobility or any other capability

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[21] *See*, e.g., Verizon Comments at 12: "[E]ffective network management practices can help to minimize the effects of [factors such as latency and jitter] in order to improve the overall performance of a network. Similarly, differentiated service offerings could help to ensure the functioning of latency- or jitter-sensitive applications in ways not possible with pure, best-efforts Internet services."

[22] *See* Qwest Comments at 9: "It is critical that the Commission, in formulating a definition of broadband in any of these contexts, do so on a technology neutral basis." Windstream argues in its comments (at p. 4), "[o]ne definition of 'broadband' should apply uniformly across all technologies. Relying on a single definition will permit objective comparisons of functionality offered to consumers by a given broadband provider, regardless of the technological platform on which its service relies." *See also* Free Press Comments at 8.

(such as availability of satellite broadband to ships at sea) that is unrelated to the ability of a particular network to support any particular Internet application.[23]

The Commission may elect to distinguish "mobile," "satellite," "DSL," "fiber" and "cable modem" as categories of methods of delivery of broadband services – to assist consumers in making more informed choices in the marketplace – but the definition of "broadband" itself must remain technologically neutral.

2. Thresholds

The threshold for last-mile bit rate under the provisional definition of broadband should be set quite low. The Nebraska Companies recommend that the Commission adopt the last-mile bit rates in the BIP/BTOP NOFA's definition of broadband (768 kbps download, 200 kbps upload advertised) for the threshold bit rate of its provisional definition, with the additional condition that the transmission must be between the user and the public Internet.

The Nebraska Companies make no recommendations at this time for the long-term broadband definitional thresholds, other than that the Commission rely on data such as ADTRAN's table of response time requirements, summarizing data published by the ITU, 3GPP and the Broadband Forum,[24] and data such as that reported in Cisco's White Paper entitled "Hyperconnectivity and the Approaching Zettabyte Era,"[25] Figure 1 for expected growth in business and consumer Internet throughput.

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[23] Unlike Verizon, CTIA and the Rural Cellular Association, the Nebraska Companies believe the Commission should disregard the notion that the term "broadband" be defined in the context of a particular technology. *See* Verizon Comments at 14; CTIA Comments at 7, 13; Rural Cellular Association Comments at 3-4.

[24] *See ADTRAN Latency White Paper* at 5.

[25] *See Hyperconnectivity and the Approaching Zettabyte Era*, Cisco White Paper, available at: http://www.cisco.com/en/US/solutions/collateral/ns341/ns525/ns537/ns705/ns827/white_paper_c11-481374.html, Figure 1, at 4.

3. Updates

The Commission can use the NBP's provisional broadband definition to aid in the initial mapping of broadband availability and to begin to establish a more formalized regulatory framework for broadband services. But to deliver on the promise of ubiquitous broadband Internet access, both access and backbone networks must deliver high performance, and increasingly higher performance, in several dimensions. The Commission's long-term definition of broadband should provide a framework for measurements of performance in the dimensions that are meaningful to consumers' broadband Internet experiences.

The Nebraska Companies recommend that the Commission regularly revisit its definition of broadband – perhaps every two years – so that changes in the mix of commonly used applications can be reflected in the set of performance indicators that are measured, and so that rising consumer expectations can be reflected in more stringent performance thresholds.

IV. Conclusion

In summary, the Nebraska Companies urge the Commission to explicitly connect its definition of "broadband" as used in the Recovery Act to "access to the public Internet." The Commission's "broadband" definitional scheme should allow for a simple, provisional definition expressed in terms of advertised last-mile bit rate, as well as a long-term, multidimensional definition that accounts for metrics such as latency and jitter in addition to sustained throughput – all of which should be measured end-to-end in order to faithfully reflect users' real experiences. The Commission's definition of

"broadband" should be technologically neutral and should be based on the large amount of work already performed by industry and international standards organizations.

September 8, 2009

THE NEBRASKA RURAL INDEPENDENT
TELEPHONE COMPANIES

Arlington Telephone Company,
The Blair Telephone Company,
Cambridge Telephone Company,
Clarks Telecommunications Co.,
Consolidated Telco, Inc.,
Consolidated Telecom, Inc.,
Consolidated Telephone Company,
Curtis Telephone Co.,
Eastern Nebraska Telephone Company,
Great Plains Communications, Inc.,
Hartington Telecommunications Co., Inc.,
Hershey Cooperative Telephone Co.,
K. & M Telephone Company, Inc.,
The Nebraska Central Telephone Company,
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